

# Parts Quality Management: Direct Part Marking via Data Matrix Symbols for Mission Assurance

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*Abstract-* A United States Government Accountability Office (GAO) review of twelve NASA programs found widespread parts quality problems contributing to significant cost overruns, schedule delays, and reduced system reliability. Direct part-marking with Data Matrix symbols could significantly improve the quality of inventory control and parts lifecycle management. This paper examines the feasibility of using 15 marking technologies for use in future NASA programs. A structural analysis is based on marked material type, operational environment (e.g., ground, suborbital, orbital), durability of marks, ease of operation, reliability, and affordability. A cost-benefits analysis considers marking technology (data plates, label printing, direct part marking) and marking types (two-dimensional machine-readable, human-readable). Previous NASA parts marking efforts and historical cost data are accounted for, including in-house vs. outsourced marking. Some marking methods are still under development. While this paper focuses on NASA programs, results may be applicable to a variety of industrial environments.